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Observations of feeding groups in the Spanish lynx (*Felis pardina*) in the Doñana National Park, SW Spain

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The Spanish lynx (*Felis pardina*), as most felids, is a solitary carnivore, i.e., it is assumed to live alone and only get into relatively long contacts with conspecifics during the mating season and rearing of the young (Ewer 1973 ; Kleiman and Eisenberg 1973 ; Waser and Jones 1983). Young solitary carnivores are assumed to disperse after a period of dependence on their mother and before reaching sexual maturity, but this process is not well known (Sunquist 1983). Particularly the time one individual remains in its natal area (philopatry) or moves away (dispersion) is related to factors such as the social system of the species, the type of habitat and food availability (Greenwood 1980 ; Waser and Jones 1983 ; Gittleman 1989 ; Bekoff 1989).

Usually lynxes forage alone. However, the low rate of interactions with conspecifics probably does not mean a reduction of the ability of each lynx to recognize other individuals (Waser and Jones 1983). For this reason, in some particular cases family-related groups may gather as it happens with some more social species of felids, such as lions (*Panthera leo*) (Schaller 1972) and feral cats (*Felis catus*) (Izawa and Ono 1986).

Herein we report two observations (one year elapsed) of a family related feeding group of free-ranging radiocollared Spanish lynxes at Doñana region, SW Spain (37°00'N, 06°30'W). The Spanish lynx is a very endangered felid and has been considered the most threatened European carnivore (Mallison 1978). The Doñana region constitutes one of the last areas where a relatively stable lynx population still lives (Delibes 1979).

The family group was formed by an adult female, mother of a young independent female and a yearling male. Lynxes were located by triangulation using a portable receiver with a hand-held directional yagi antenna.

The first observation was recorded on 5 December 1985. By then the young female was 21 months old and lived in its natal area, and the yearling male was 6 months old and was located with its mother approximately 75 % of the time. In the morning (08:00 hours) of 5 December a yearling female fallow

deer (*Dama dama*) carcass weighing about 20-25 kg was discovered between marsh and shrubland, close to a pond at the northeast limit of the study area and within the home range of the adult female (fig. 1). The carcass showed wounds in the throat and larynx caused by lynx canine-teeth (Beltrán *et al.* 1985). The right limbs and some lateral parts of the body were eaten and the gastrointestinal tract had been pulled aside and laid at a short distance. The day before at 21:19 hours, we noted that the adult female was located at the place where the carcass was found. So, with a high probability this lynx killed the doe.

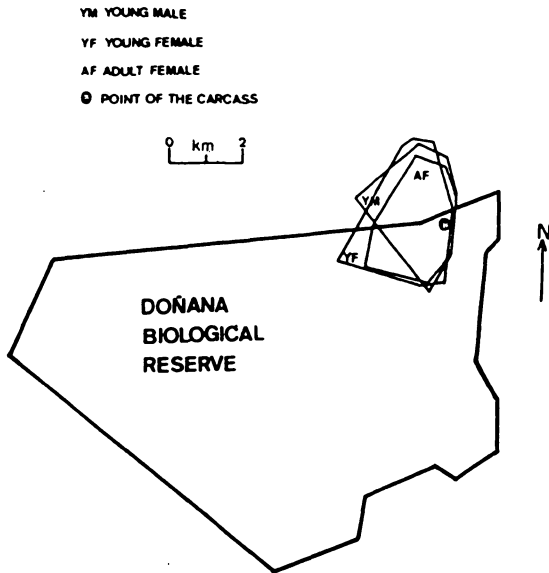


Fig. 1. — Winter 1985 home ranges of the radiocollared Spanish lynxes. YF was nutritionally independent but still living in the natal area. YM was most of his time with its mother AF. The limits of the Doñana Biological Reseve (study area) had been drawn.

By then, the yearling male was about 800 meters west from its mother and the young female was located 400 meters north. On 5 December, at 10:56 the adult female and its yearling were located together about 300 meters away from the carcass under a heath (*Erica* sp.), and the young female was seen crossing a path 60 meters away (very probably it was feeding from the mother's killed prey). On 6 December, at 12:45 the three lynxes were located eating together from the fallow deer carcass. The next day, the three lynxes were apart and the only remains of the carcass were some large bones and pieces of skin. The second observation took place on 25 November 1986 when the young male was 18 months old and independent, but still living in its natal area and the young female (33 months old) by then was an adult established lynx in an exclusive home range bounding that of its mother (figure 2). In that morning a young male fallow-deer carcass weighing about 18-20 kg was found in a similar place as the other record, about 800 meters to the south from that former one.

Hind limbs and some other pieces were eaten. When the carcass was found, we saw the adult female and the young male at a few meters away from the carcass. On the day before at 09:20 the adult female was located very close to the place of the carcass. The other female occupying the neighboring home range was also very close to the remains (this point was where the two female territories met ; fig. 2) but later, we never saw this animal eating from it. By then, the young male was located about 1 km away from the two other lynxes.

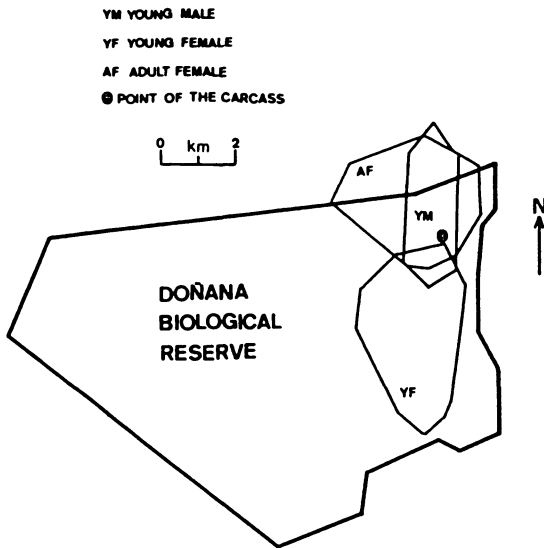


Fig. 2. — Winter 1986 home ranges of the family related group. YF dispersed from natal area and established in a neighboring territory. YM was independent but still living in AF home range.

In the morning when the carcass was found, however, we saw the adult female and its offspring a few meters away from it, and at 16:00 both were feeding. On 26 at 09:00 the mother continued eating and the son was apart. The next day both were far away from the carcass and the only rests were some large bones and pieces of skin.

We do not know how the young male was attracted to the carcass, but in the two records, it was separated from its mother when the kill was done, and subsequently met the adult female to eat. Probably there is some kind of communication between mother and cubs, as described for bobcats (*Felis rufus*) by Winegarner (1984).

Our observations show how flexible can be the social behaviour of a "solitary" felid as the Spanish lynx. Similar trends have been shown in the last years in many species considered solitary, especially canids (Macdonald 1979, Moehlman 1989). Also there is an increased number of records of a certain sociability in solitary felids. McDougal (1977, in Sunquist 1981) has recorded groups from six to seven tigers (*Panthera tigris*) around killed baits. Other types of socialization have been described in mountain lions (*Felis concolor*) by Seidens-

ticker *et al.* (1973) during an adjustment of the population after the death of some adult individuals, and in bobcats, Bailey (1974) has recorded 4 adult individuals reunited in a cave rock due to the inclement weather and a general rabbit scarcity.

Usually, sociability is produced by a delay in dispersion, allowing the offsprings to reach the age of maturity in their natal ranges (e.g. Izawa and Ono 1986 ; for feral cats). In our case the young female established its own territory when it was 26 months old, while the young male begun dispersal movements when it was 23 months old. However it continued visiting its natal area until the end of the radio-collar life battery several months later (a similar pattern of predispersal movements has been recorded by Sunquist 1983 for leopards, *Panthera pardus*). At least in the first case, as shown in this note, the female coexisted in the natal range with its brother of the following generation, against the "theory" about solitary felids, where dispersion would start before the cubs of following year are born (e.g. Kitchings and Story 1984, for bobcats).

Kruuk (1978) and Macdonald (1983) suggested highly concentrated resources could favour delayed dispersion, moreover, young females could breed in the natal area before dispersion as reported by Maehr *et al.* (1989) for cougars. These conditions occur in Doñana where lynx staple preys (rabbits ; 85 % and fallow-deer ; 7 % Delibes 1980) tend to be concentrated by the border of the marsh (Rogers and Myers 1980). In winter, when rabbit density is at its minimum (Beltrán, 1988), sharing a large prey with young, even those already independent, could favour the female fitness by increasing the survival rates of its offspring. Finally, our second observation suggests the limit for this altruistic behaviour that in the case of the Spanish lynx would be the establishment by the offspring in a new territory.

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